DECLARATION

I, Jeffrey C. Barfield of Alpenrosenstrasse 3, 82377 Penzberg, Germany, do hereby declare that I am conversant with the English and German languages and that I am a competent translator thereof.

I verify that the attached English translation is a true and correct translation of the submission to the European Patent Office, with annexes, of April 27, 2005 with respect to the international file reference PCT/EP2004/013335.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: June 13, 2005

Jeffrey C. Barfield

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Applicant: **Hartmut S. Engel**

In response to the written official letter of the International Search Authority of March 31, 2005:

We herewith enclose

- new claims 1, 7 and 12 to 17,
- hand-written revisions of description pages 1, 2, 3, 3e and 12, as well as
- new description pages 1a and 3a – 3d.

We request that the named documents, together with the original claims 2 to 6 and 8 to 11 as well as the original description pages 4 to 11 and 13 to 16 and the originally filed drawings be used as the basis for the future international examination procedure.

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1. Disclosure

The characterizing portion of the originally filed claim 1 was taken over into the preamble of the new claim 1, with it additionally being recited for the putting into more specific terms of downlights in delineation to surface luminaires that scattered light is discharged from the diffuse light discharge region around the direct light discharge region. A corresponding disclosure can be found in lines 23 to 25 of page 2 of the originally submitted description.

The characterizing portion of the new claim 1 consists of the necessary features of the originally filed claim 7 and of the originally filed claim 13. The fact that the scattering plate, as recited in the characterizing portion of the new claim 1, can be made "translucent" results from lines 19 and 20 of the originally filed page 6 of the description.

Claim 7 only contains those optional features of the originally filed claim 7 which were not included in the characterizing portion of the new claim 1.

The newly filed claims 12 to 17 correspond to the original claims 14 and 16 to 20. They were adapted to the remaining claims with respect to their dependencies. The originally filed claim 15 was removed.

The description was also adapted to the new claims, with the complete prior art named in the international search report

additionally being appreciated on pages 1, 1a, 3a and 3b of the newly filed description.

2. Patentability

Built-in lamps are known from the prior art which also have a diffuse light discharge region in addition to a direct light discharge region. Two different types must generally be distinguished with such lamps. The first type relates to so-called "surface luminaires" which usually have a rectangular, elongated shape and are operated with fluorescent tubes whose length can easily amount to one meter or more. These surface luminaires have a direct light discharge region directly beneath the fluorescent tubes which is adjoined on both sides by a respective diffuse light discharge region such that ultimately three light discharge regions of the same length with respect to one another extend adjacent and parallel to one another with - as mentioned - the direct light discharge region provided in the centre adjoining a respective diffuse light discharge region on both sides. Such surface luminaires are known, for example, from the document EP-A-1 033 503.

In contrast to surface luminaires, the prior art, however, also discloses so-called downlights whose extent in the installation plane is as a rule approximately of equal size in two directions perpendicular to one another. Downlights of this kind usually have a circular or square shape, for example. A downlight of this kind is known, for example, from document DE-A-38 26 676. This downlight is admittedly made largely free of glare, but does not have any diffuse light discharge region so that, in accordance with

the invention, it ultimately only works in accordance with the dark-light principle, which has the disadvantage that the persons located in an illuminated room cannot consciously perceive where the respective light sources are located so that the creation of a warm room climate in technical lighting terms is not possible here.

In contrast to the last-named downlight, the document DE-A-43 36 023 A1 discloses in its Figure 3 a rotationally symmetrical downlight in which a central direct light discharge region UR is surrounded in annular form by a diffuse light discharge region HR. The diffuse light discharge region HR is acted on via a main reflector which is, for example, white on the inner side such that the inner surface of this white main reflector 11 can be perceived by an observer without glare, which ultimately has the result that the observer can "locate" the light source, unlike such downlights which only work in accordance with the dark-light principle. The present invention relates to downlights of this kind not working only in accordance with the dark-light principle.
Accordingly, it is also recited in the preamble of the new claim 1 that a direct light discharge region is surrounded by a diffuse light discharge region such that scattered light is discharged from the diffuse light discharge region around the direct light discharge region.

The downlight in accordance with DE-A-43 36 023 known from the prior art and explained above has disadvantages:

On the one hand, the manufacture of the named downlights is associated with a comparatively high cost and effort, since a

relatively large reflector (main reflector 11) which covers the whole light discharge regions UR and HR must be provided inside a lamp housing not shown in the drawings of DE-A-43 36 023 and also not described in more detail. This reflector must moreover be worked very precisely and cleanly in a complex and costly manner since it is responsible in corresponding regions both for the reflection of direct light (region UR) and for the reflection of scattered light (region HR) and in this process has to ensure that the light reflected by it is radiated as uniformly as possible by all reflector regions into the regions to be illuminated. The reflector can moreover also be viewed directly by an observer via the regions HR so that it must also have a visually appealing surface. Accordingly, the manufacture, coating and installation of the reflector into the lamp housing is associated with an economically disadvantageous effort.

On the other hand, it is also disadvantageous in a downlight in accordance with DE-A-43 36 023 that the complexly designed arrangement of a plurality of reflectors (11, 12, 14, DR) required for this downlight can only be cleaned with a high effort or insufficiently due to areas with difficult access between the individual reflector components so that dust deposits on the reflector components result in a much deteriorated efficiency. A gathering of dust on the named reflector components is additionally promoted in a downlight of the described type in that the main reflector 11 is made completely open in the direction of illumination so that a deposition of dust on reflector surfaces cannot be avoided in any manner.

An underlying object of the present invention in accordance with the newly submitted claim 1 accordingly consists of further developing a downlight having a diffuse light discharge region surrounding a direct light discharge region such that the manufacturing costs of the downlight are much reduced and such that it can be ensured, despite the reduced manufacturing cost, that the efficiency of the downlight is not impaired in the long term by contamination, in particular by dust.

This object is satisfied in accordance with the invention in that the bulb and the direct light reflector are arranged in a housing whose inner surface is made at least regionally as an additional reflector; and in that the housing is terminated in at least a largely dust-proof manner by a translucent scattering plate in the region of the diffuse light discharge region and by a plate which is in particular transparent in the region of the direct light discharge region.

In accordance with the invention, an additional reflector is therefore provided in addition to a conventional direct light reflector which is formed in a very simply manner by a suitably made or coated inner surface of the lamp housing. This additional reflector in accordance with the invention can then direct light from the bulb to the diffuse light discharge region and thus provide a sufficient amount of light in the diffuse light discharge region. In contrast to the prior art, this desired effect is achieved with an extremely simple reflector structure.

Since the additional reflector in accordance with the invention - in contrast to the main reflector in accordance with DE-A-43 36 023

- does not have to have any special surface coating, it should be avoided in accordance with the invention that this additional reflector can be directly viewed by the observer of the downlight in accordance with the invention via the diffuse light discharge region, which is achieved in accordance with the invention in that the diffuse light discharge region is terminated by a translucent scattering plate. Light is thus directed by the additional reflector onto this translucent scattering plate which then radiates scattered light, among other things, in the direction of a viewer without the viewer being able to see the additional reflector behind the translucent scattering plate directly.

The named scattering plate simultaneously serves in an extremely advantageous manner to avoid an entry of dust into the lamp in accordance with the invention through the diffuse light discharge region. To generally prevent the entry of dust through the whole light discharge surface of the lamp in accordance with the invention, in accordance with the invention the direct light exchange region is also additionally terminated by a plate, which is in particular transparent. Since both the translucent scattering plate can terminate the diffuse light discharge region and the further plate can terminate the direct light discharge region in an at least largely dust-proof manner, an operation of the downlight in accordance with the invention can be ensured at a high efficiency over long periods without impairment by dust deposits.

The document DE-A-43 36 023 discussed above in particular does not provide any stimulation with respect to the explained features in accordance with the invention, since not even the problems eliminated in accordance with the invention are

mentioned in the named document. In this respect, an inventive aspect is absolutely required in order to arrive at the solution in accordance with the invention from the subject matter of the named document.

The same also applies accordingly to the document GB-A-548 117 which is cited in the initially named search report and which shows a downlight in each of the Figures 6 and 8 which has an annular region from which scattered light can be discharged. These downlights namely also use separate reflectors 34 shaped in a complicated and costly manner such that the skilled person cannot see any stimulation here to the effect of simply using the inner surfaces of the housing as reflectors responsible for the scattered light.

In addition, there is the fact that the downlights shown in Figures 6 and 8, unlike the present invention, are not able to radiate direct light. It is rather the case that the radiation of direct light is directly avoided by a screen element 38 in accordance with Figure 6 of the named document and by the mirror-coated lower side of an incandescent lamp in accordance with Figure 8 of the named document. In this respect, the last-named document must moreover be considered as non-generic.

In view of the aforesaid recitations, it can be stated that the documents named in the international search report cannot give any stimulation with respect to a built-in lamp in accordance with the now current claim 1 and are thus not suitable to question the patentability of the now current claim 1. We would therefore request the issuing of a

positive international examination communication under consideration of the aforesaid recitations.

Patent Attorney
Dr. Martin Finsterwald

Enclosures:
New claims 1, 7 and 12 to 17;
Hand-written revisions of description pages 1, 2, 3, 3e and 12;
New description pages 1a and 3a – 3d;
(in triplicate in each case)

Claims

1. A built-in lamp comprising a holder for fastening in an installation surface (11), in particular in a room ceiling, a bulb (6) and a reflector, with a reflector opening disposed in the direction of illumination defining a direct light discharge region (1), which is surrounded by a diffuse light discharge region (2) such that scattered light is discharged from the diffuse light discharge region (2) around the direct light discharge region (1),
characterized in that
the bulb (6) and the direct light reflector (4) are arranged in a housing (10) whose inner surface is made at least regionally as an additional reflector (7); and
in that the housing (10) is terminated in at least a largely dust-proof manner by a translucent scattering plate (13, 15) in the region of the diffuse light discharge region (2) and by a plate (13, 14) which is in particular transparent in the region of the direct light discharge region (1).

7. A built-in lamp in accordance with any one of the preceding claims, characterized in that the housing (10) is made to be light-proof and/or dust-proof.

12. A built-in lamp in accordance with any one of the preceding claims, characterized in that the translucent scattering plate (13) and the plate (13), which is in particular transparent, are made in one piece.

13. A built-in lamp in accordance with any one of the preceding claims, characterized in that the direct light discharge region (1) has a circular shape.

14. A built-in lamp in accordance with any one of the preceding claims, characterized in that the diffuse light discharge region (2) is bounded on the inner side by a circular line (3) and on the outer side by a polygonal line, in particular by a rectangular or square line (8), or by a further circular line.

15. A built-in lamp in accordance with any one of the preceding claims, characterized in that the direct light reflector (4) is held pivotably in the housing (10).

16. A built-in lamp in accordance with any one of the preceding claims, characterized in that a common inclination of the direct light discharge region (1) with the diffuse light discharge region (2) is adjustable with respect to the installation surface (11) by a pivoting of the direct light reflector (4); or
in that an inclination of the direct light discharge region (1) is adjustable with respect to the diffuse light discharge region (2) by a pivoting of the direct light reflector (4).

17. A built-in lamp in accordance with any one of the preceding claims, characterized in that the direct light reflector (4) is held pivotably in the housing (10) together with the bulb (6).

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A built-in lamp

The invention relates to a built-in lamp ~~comprising a holder for fastening~~ in accordance with the preamble of claim 1. in an installation area, in particular in a room ~~ceiling~~, a bulb and a reflector, with a ~~reflector opening~~ disposed in the direction of illumination ~~defining a direct light discharge region.~~

Built-in lamps ~~of this kind~~ are known from the prior art in a variety of forms. Dark-light lamps are known*, among others, in which the bulb and the reflector are arranged with respect to one another such that the bulb cannot be seen on the reflector either directly or in reflection from a specific angle of view and thus cannot develop any glare effect. This avoidance of a glare effect, however, also results in the ceiling region of a room illuminated in this manner remaining largely non-illuminated and in the relationship between the light source and the illuminated region perceived as natural by a person being lost, since it cannot be recognized from which light source the light originates.

This effect is alleviated in accordance with the prior art in that a partly or completely frosted glass plate is secured in the region of the reflector opening disposed in the direction of illumination or beneath it in order to hereby generate diffuse light. However, the portion of the directed, direct light is thus partly or completely reduced, which is in turn disadvantageous.

* e.g. in accordance with DE-A-38 26 676

This e.g. applies to a lamp in accordance with document GB-A-548 117 which shows a downlight in each of the Figures 6 and 8 which has an annular region from which scattered light can be discharged. These downlights use separate reflectors 34 shaped in a complicated and costly manner Furthermore, the downlights shown in Figures 6 and 8 are not able to radiate direct light. It is rather the case that the radiation of direct light is directly avoided by a screen element 38 in accordance with Figure 6 of the named document and by the mirror-coated lower side of an incandescent lamp in accordance with Figure 8 of the named document.

* of the lack of relationship between the light source and the illuminated region

Furthermore, built-in lamps are known from the prior art which likewise avoid the aforesaid effect*. With these built-in lamps, scattering reflectors, for example white reflectors are used instead of specularly reflecting reflectors. These scattering reflectors have the effect that the light source or its illuminated reflector becomes visible at practically all angles of observation, albeit with a disadvantageous glare effect again occurring.

Finally, built-in lamps are known from the prior art in ~~An object of the invention consists of further developing a built in lamp of~~ which ~~the initially named kind such that~~, on the one hand, a glare effect is avoided in accordance with the dark-light principle and such that, on the other hand, it is ensured that the persons located in the illuminated room can perceive the light sources used for the illumination consciously or even unconsciously such that a natural relationship is created between the light source and the illuminated region and a warm room climate is obtained in a technical lighting manner. This is achieved

~~In accordance with the invention, the object is satisfied by the features of claim 1 and in particular~~ in that the direct light discharge region is surrounded by a non-glare diffuse light discharge region. ~~In accordance with the invention, it~~ It is therefore possible to work in accordance with the dark-light principle in the direct light discharge region and the advantages resulting therefrom can be utilized, with scattered light, however, simultaneously being discharged from the diffuse light discharge region in accordance with the invention around the direct light discharge region, with the luminance of said scattered light being able to be selected such that no glare effect occurs. A visible marking of the light source is thus always ensured, which results in a room mood perceived as pleasant with

a good light atmosphere despite the use of the dark-light principle. In addition, a generation of softer shadows and an advantageous general room brightening is additionally achieved by the scattered light being discharged through the diffuse light discharge region~~, in accordance with the invention.~~

~~In addition to these advantages, interesting design possibilities result from~~ the diffuse light discharge region in accordance with the invention, for example by an individual choice of the shape of the diffuse light discharge region or of the color of the discharged scattered light.

It is advantageous for the direct light discharge region and the diffuse light discharge region to be acted on by a common bulb, since no separate bulb has to be provided for the diffuse light discharge region in accordance with the invention in this manner. No additional bulb costs thus arise with respect to built-in lamps known from the prior art and a change of the bulb can also take place with the same effort as with already known built-in lamps.

In accordance with a preferred embodiment of the invention, the reflector opening defining the direct light discharge region can be associated with a direct light reflector on whose side remote from the direct light discharge region an additional reflector or background reflector is provided which acts both on the direct light discharge region and on the diffuse light discharge region. With an arrangement of this kind, the bulb radiates direct light into the actual direction of illumination via the direct light reflector, on the one hand, and in a direction opposite to the direction of ~~illumination toward the additional reflector, on the other hand, which~~

A rotationally symmetrical downlight with which the aforesaid advantages is known from the document DE-A-43 36 023 A1 and in particular from its Figure 3 in accordance with which a central direct light discharge region UR is surrounded in annular form by a diffuse light discharge region HR. The diffuse light discharge region HR is acted on via a main reflector which is, for example, white on the inner side such that the inner surface of this white main reflector can be perceived by an observer without glare, which ultimately has the result that the observer can "locate" the light source, unlike such downlights which only work in accordance with the dark-light principle. The downlight explained above and known from the prior art in accordance with DE-A-43 36 023 has disadvantages:

On the one hand, the manufacture of the named downlights is associated with a comparatively high cost and effort, since a relatively large reflector (main reflector) which covers the whole light discharge regions UR and HR must be provided inside a lamp housing. This reflector must moreover be worked very precisely and cleanly in a complex and costly manner since it is responsible in corresponding regions both for the reflection of direct light (region UR) and for the reflection of scattered light (region HR) and in this process has to ensure that the light reflected by it is radiated as uniformly as possible by all reflector regions into the regions to be illuminated. The reflector can moreover also be viewed directly by an observer via the regions HR so that it must also have a visually appealing surface.

Accordingly, the manufacture, coating and installation of the

reflector into the lamp housing is associated with an economically disadvantageous effort.

On the other hand, it is also disadvantageous in a downlight in accordance with DE-A-43 36 023 that the complexly designed arrangement of a plurality of reflectors required for this downlight can only be cleaned with a high effort or insufficiently due to areas with difficult access between the individual reflector components so that dust deposits on the reflector components result in a much deteriorated efficiency. A gathering of dust on the named reflector components is additionally promoted in a downlight of the described type in that the main reflector is made completely open in the direction of illumination so that a deposition of dust on reflector surfaces cannot be avoided in any manner.

An underlying object of the present invention consists of further developing a downlight having a diffuse light discharge region surrounding a direct light discharge region such that the manufacturing costs of the downlight are much reduced and such that it can be ensured, despite the reduced manufacturing cost, that the efficiency of the downlight is not impaired in the long term by contamination, in particular by dust.

This object is satisfied in accordance with the invention in that the bulb and the direct light reflector are arranged in a housing whose inner surface is made at least regionally as an additional reflector; and in that the housing is terminated in at least a largely dust-proof manner by a translucent scattering plate in the region of the diffuse

light discharge region and by a plate which is in particular transparent in the region of the direct light discharge region.

In accordance with the invention, an additional reflector is therefore provided in addition to a conventional direct light reflector which is formed in a very simply manner by a suitably made or coated inner surface of the lamp housing. This additional reflector in accordance with the invention can then direct light from the bulb to the diffuse light discharge region and thus provide a sufficient amount of light in the diffuse light discharge region. In contrast to the prior art, this desired effect is achieved with an extremely simple reflector structure.

Since the additional reflector in accordance with the invention - in contrast to the main reflector in accordance with DE-A-43 36 023 - does not have to have any special surface coating, it should be avoided in accordance with the invention that this additional reflector can be directly viewed by the observer of the downlight in accordance with the invention via the diffuse light discharge region, which is achieved in accordance with the invention in that the diffuse light discharge region is terminated by a translucent scattering plate. Light is thus directed by the additional reflector onto this translucent scattering plate which then radiates scattered light, among other things, in the direction of a viewer without the viewer being able to see the additional reflector behind the translucent scattering plate directly.

The named scattering plate simultaneously serves in an extremely advantageous manner to avoid an entry of dust into the lamp in accordance with the invention through the diffuse light discharge region. To generally prevent the entry of dust through the whole light discharge surface of the lamp in accordance with the invention, in accordance with the invention the direct light exchange region is also additionally terminated by a plate, which is in particular transparent. Since both the translucent scattering plate can terminate the diffuse light discharge region and the further plate can terminate the direct light discharge region in an at least largely dust-proof manner, an operation of the downlight in accordance with the invention can be ensured at a high efficiency over long periods without impairment by dust deposits.

~~a good light atmosphere despite the use of the dark light principle. In~~ addition, a generation of softer shadows and an advantageous general room brightening is additionally achieved by the scattered light being discharged through the diffuse light discharge region in accordance with the invention.

In addition to these advantages, interesting design possibilities result from the diffuse light discharge region in accordance with the invention, for example by an individual choice of the shape of the diffuse light discharge region or of the color of the discharged scattered light.

It is advantageous for the direct light discharge region and the diffuse light discharge region to be acted on by a common bulb, since no separate bulb has to be provided for the diffuse light discharge region in accordance with the invention in this manner. No additional bulb costs thus arise with respect to built-in lamps known from the prior art and a change of the bulb can also take place with the same effort as with already known built-in lamps.

In accordance with a preferred embodiment of the invention, the reflector opening defining the direct light discharge region can be associated with a direct light reflector on whose side remote from the direct light discharge region an additional reflector or background reflector is provided which acts both on the direct light discharge region and on the diffuse light discharge region. With an arrangement of this kind, the bulb radiates direct light into the actual direction of illumination via the direct light reflector, on the one hand, and in a direction opposite to the direction of illumination toward the additional reflector, on the other hand, which

The base of the housing 10 forms a region of the additional reflector 7. Further regions of the additional reflector 7 are formed by the side walls of the housing 10 and by the outer side of the direct light reflector 4.

The housing 10 is terminated at its open side facing the region to be illuminated by a plate 13 which has different optical properties in different regions. The plate is made completely transparent in the direct light discharge region 1 so that light coming from the bulb 6 can pass through this plate region without impediment. In the diffuse light discharge region 2, in contrast, the plate 13 is made as a scattering plate which scatters light incident on it from the inner side of the housing and thus generates diffuse light. The region of the scattering plate extends up to the outer edge of the frame 9 so that the frame 9 is covered by the scattered light region of the plate 13.

~~Alternatively, in a more cost-favorable variant, the scattered light region of~~ the plate 13 can ~~also~~ be designed as a ring element having apertures, in particular as a perforated metal ~~sheet~~ with a small perforation size, with it being advantageous in this case for the direct discharge region not to be ~~made closed by means of a plate, but to be made open.~~

In Fig. 2, three light rays originating from the bulb 6 are shown which are directly incident onto the transparent region of the plate 13 from the bulb 6 and which, due to the transparency of the plate 13, pass through it without impediment. A further light ray, likewise only shown by way of example in Fig. 2, is incident from the light source 6 onto the specularly reflecting inner side of the direct light reflector 4 from where the light ray is again deflected through the transparent region of the plate 13. An